



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

This expression is shown to give known particular integrals, such as $(1 - 2r \cos \theta + r^2)^{-\frac{1}{2}}$, and

$$r^n (\sin \theta)^{-n} \left(\sin \theta \frac{d}{d\theta} \sin \theta \right)^n \left(\tan \frac{\theta}{2} \right) \cos i\phi.$$

It appears probable, therefore, that the generalization of the result obtained for the limited value of n is legitimate; but the author does not profess to demonstrate this conclusion, believing that the principle of the "permanence of equivalent forms" is not at present established in such a sense as to amount to a demonstration.

VII. "A Memoir on Curves of the Third Order." By ARTHUR CAYLEY, Esq., F.R.S. Received Oct. 30, 1856.

(Abstract.)

A curve of the third order, or cubic curve, is the locus represented by an equation such as $U = (*)(x, y, z)^3 = 0$; and it appears by my "Third Memoir on Quantics," that it is proper to consider, in connexion with the curve of the third order, $U=0$, and its Hessian $HU=0$ (which is also a curve of the third order), two curves of the third class, viz. the curves represented by the equations $PU=0$ and $QU=0$. These equations, I say, represent curves of the third class; in fact, PU and QU are contravariants of U , and therefore, when the variables x, y, z of U are considered as point coordinates, the variables ξ, η, ζ of PU, QU must be considered as line coordinates, and the curves will be curves of the third class. I propose (in analogy with the form of the word Hessian) to call the two curves in question the Pippian and Quippian respectively. A geometrical definition of the Pippian was readily found; the curve is in fact Steiner's curve R_0 mentioned in the memoir "Allgemeine Eigenschaften der algebraischen Curven," Crelle, t. xlvii. pp. 1-6, in the particular case of a basis-curve of the third order; and I also found that the Pippian might be considered as occurring implicitly in my "Mémoire sur les Courbes du Troisième Ordre," Liouville, t. ix. p. 285, and "Nouvelles Remarques sur les Courbes du Troisième Ordre," Liouv. t. x. p. 102. As regards the Quippian, I

have not succeeded in obtaining a satisfactory geometrical definition ; but the search after it led to a variety of theorems, relating chiefly to the first-mentioned curve, and the results of the investigation are contained in the present memoir. Some of these results are due to Mr. Salmon, with whom I was in correspondence on the subject. The character of the results makes it difficult to develop them in a systematic order ; but the results are given in such connexion one with another, as I have been able to present them in. Considering the object of the memoir to be the establishment of a distinct geometrical theory of the Pippian, the leading results will be found summed up in the nine definitions or modes of generation of the Pippian, given in the concluding number. In the course of the memoir I give some further developments relating to the theory in the memoirs in Liouville above referred to, showing its relation to the Pippian, and the analogy with theorems of Hesse in relation to the Hessian.

VIII. "On the k -partitions of a Polygon and Polyace." By the Rev. T. P. KIRKMAN, M.A. Communicated by ARTHUR CAYLEY, Esq. Received November 13, 1856.

(Abstract.)

The problem relating to the polyace is the reciprocal of that relating to the polygon, and is not separately discussed. By the k -partitions of a polygon, the author means the number of ways in which the polygon can be divided by $(k-1)$ diagonals, no one of which crosses another ; two ways being different only when no cyclical permutation or reversion of the numbers at the angles of the polygon can make them alike : it is assumed that the polygon is of the ordinary convex form, so that all the diagonals lie within its area. The author remarks, that the enumeration of the partitions of the polygon and polyace is indispensable in the theory of polyedra, and that in his former memoir "On the Enumeration of x -edra having Triedral Summits and an $(x-1)$ -gonal Base," Phil. Trans. 1856, p. 399, he has, in fact, investigated the $(r-2)$ -partitions of the r -ace